AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A color image processing method comprising the steps of:

(a) sorting image pixels according to a color distance between image pixels and a central pixel;

(b) grouping the sorted pixels into groups in which a difference in intragroup color distance is minimum and a difference in intergroup color ~~difference~~ distance is maximum; and

(c) performing filtering by replacing a central pixel value with a predetermined pixel value determined by pixel values of pixels in the groups.

2. (original): The color image processing method according to claim 1, further comprising the step of defining a window having predetermined size within an input color image, wherein the image pixels are pixels within the window.

3. (previously presented): The color image processing method according to claim 1, further comprising the step, prior to step (b), of removing pixels having a color distance difference greater than or equal to a predetermined threshold for a predetermined number of pixels at a beginning and latter parts of the sorted pixels.

4. (original): The color image processing method according to claim 3, wherein the predetermined number is less than or equal to L/2, in which L is a predetermined positive integer indicating the size of an LxL window.

5. (previously presented): The color image processing method according to claim 2, further comprising the step, prior to step (b), of removing pixels having a color distance difference greater than or equal to a predetermined threshold for a predetermined number of pixels at a beginning and latter parts of the sorted pixels.

6. (original): The color image processing method according to claim 1, wherein the step (b) includes grouping the sorted pixels using a function based on a Fisher's discriminant estimation method.

7. (original): The color image processing method according to claim 2, wherein the step (b) includes grouping the sorted pixels using a function based on a Fisher's discriminant estimation method.

8. (original): The color image processing method according to claim 3, wherein the step (b) includes grouping the sorted pixels using a function based on a Fisher's discriminant estimation method.

9. (original): The color image processing method according to claim 4, wherein the step (b) includes grouping the sorted pixels using a function based on a Fisher's discriminant estimation method.

10. (original): The color image processing method according to claim 5, wherein the step (b) includes grouping the sorted pixels using a function based on a Fisher's discriminant estimation method.

11. (previously presented): The color image processing method according to claim 1, wherein the step (b) comprises the sub-steps of:

(b-1) selecting a first group consisting of 0th through (i- 1)th pixels, and a second group consisting of ith through Kth pixels, wherein i is an integer from through K and $K=L^2-1$;

(b-2) obtaining respective averages of color distance differences for pixels of the first and second groups as follows:

$$a_1(i)=\frac{1}{i}\sum_{j=0}^{i-1} d_j(n) \quad \text{and} \quad a_2(i)=\frac{1}{K+1-i}\sum_{j=i}^{K} d_j(n);$$

(b-3) obtaining the respective variances of color distance differences for pixels of the first and second groups as follows:

$$S_1^2(i)=\sum_{j=0}^{i-1}\left|d_j(n)-a_1(i)\right|^2 \quad \text{and} \quad S_2^2(i)=\sum_{j=i}^{K}\left|d_j(n)-a_2(i)\right|^2;$$

(b-4) calculating a value $J(i)$ as follows, using the obtained average and variance:

$$J(i)=\frac{\left|a_1(i)-a_2(i)\right|^2}{s_1^2(i)+s_2^2(i)}; \text{ and}$$

(b-5) obtaining a value of i which makes $J(i)$ maximum as follows:

$$m(n)=\arg\max_{i}\{J(i)\}$$

and selecting pixels ranging from a pixel having a small color distance to a pixel having the obtained value of *i* to determine a size m(n) a peer group P(n).

12. (previously presented): The color image processing method according to claim 11, further comprising, after step (b-5), the steps of:

selecting *i* pixels ranging from a pixel having a minimum color distance among the pixels sorted according to the color distance from the central pixel and setting a largest value of the color distances of the selected pixels as a maximum color distance within the peer group; and

performing color quantization by weighting color vectors of respective pixels by exp(-T(n)), wherein T(n) is the maximum color distance within the peer group.

13. (previously presented): The color image processing method according to claim 11, further comprising, after step (b-5), the steps of:

selecting *i* pixels ranging from a pixel having a minimum color distance among the pixels sorted according to the color distance from the central pixel and setting a largest value of the color distances of the selected pixels as a maximum color distance within the peer group; and

obtaining an average of T(n) values of a whole image and performing color quantization using a value obtained by multiplying the average value of T(n) with a predetermined constant to determine a number of clusters, wherein T(n) is the maximum color distance within the peer group.

14. (previously presented): The color image processing method according to claim 11, further comprising, after the step (b-5), the steps of:

selecting pixels whose number corresponds to the size of the peer group, ranging from a pixel having a minimum color distance among the pixels sorted according to the color distance from the central pixel and setting a largest value of the color distances of the selected pixels as a maximum color distance within the peer group; and

weighting color vectors of the respective pixels by exp(-T(n)), wherein T(n) is the maximum color distance within the peer group, and performing color quantization using a value obtained by multiplying an average of T(n) values of a whole image with a predetermined constant, to determine a number of clusters.

15. (previously presented): The color image processing method according to claim 11, wherein the step (c) includes replacing a central pixel $X_0(n)$ with a new pixel $X'_0(n)$ as follows:

$$X'_0(m) = \frac{\sum_{i=0}^{m(n)-1} W_i\, p_i(n)}{\sum_{i=0}^{m(n)-1} W_i}$$

where $p_i(n)$ are pixels constituting the peer group and W_i are predetermined weights corresponding to $p_i(n)$.

16. (previously presented): The color image processing method according to claim 1, wherein the step (c) includes replacing a color vector of the central pixel with an average color vector value weighted by a predetermined weight that is larger for a pixel closer to the central pixel and is smaller for a pixel distant from the central pixel.

17. (original): The color image processing method according to claim 16, wherein the predetermined weight is a value determined by a standard Gaussian function.

18. (previously presented): The color image processing method according to claim 1, further comprising the step of performing color quantization by weighting color vectors of the respective pixels by exp(-T(n)), wherein T(n) is a maximum color distance within one group.

19. (currently amended): A color image processing method comprising the steps of:

(a) receiving a color image frame and segmenting the same into a plurality of color images by a predetermined segmentation method;

(b) sorting image pixels according to a color distance between the image pixels and a central pixel, with respect to an image selected among the segmented color images;

(c) grouping the sorted pixels into groups in which a difference in an intragroup color distance is minimum and a difference in an intergroup color ~~difference~~ distance is maximum; and

(d) performing filtering by replacing a central pixel value with a predetermined pixel value determined by pixel values of pixels in the groups.

20. (original): The color image processing method according to claim 19, before the step (b), further comprising the step of defining a window having a predetermined size within the selected color image, wherein the image pixels are pixels within the window.

21. (previously presented): The color image processing method according to claim 19, further comprising, before the step (b), the step of removing pixels having a color distance difference greater than or equal to a predetermined threshold, for a predetermined number of pixels at a beginning and latter parts of the sorted pixels.

22. (original): The color image processing method according to claim 21, wherein the predetermined number is less than or equal to L/2, in which L is a predetermined positive integer indicating the size of and LxL window.

23. (canceled).

24. (original): The color image processing method according to claim 19, wherein the step (b) includes grouping the sorted pixels using a function based on Fisher's discriminant estimation method.

25. (original): The color image processing method according to claim 20, wherein the step (b) includes grouping the sorted pixels using a function based on Fisher's discriminant estimation method.

26. (original): The color image processing method according to claim 21, wherein the step (b) includes grouping the sorted pixels using a function based on Fisher's discriminant estimation method.

27. (original): The color image processing method according to claim 22, wherein the step (b) includes grouping the sorted pixels using a function based on Fisher's discriminant estimation method.

28. (canceled).

29. (previously presented): The color image processing method according to claim 19, wherein the step (b) comprises the sub-steps of:

(b-1) selecting a first group consisting of 0th through *(i-1)*th pixels, and a second group consisting of *i*th through *K*th pixels, wherein *i* is an integer from 0 through *K* and $K=L^2-1$;

(b-2) obtaining respective averages of the color distance differences for pixels of the first and second groups as follows:

$$a_1(i) = \frac{1}{i}\sum_{j=0}^{i-1} d_j(n) \quad \text{and} \quad a_2(i) = \frac{1}{K+1-i}\sum_{j=i}^{K} d_j(n)$$

(b-3) obtaining respective variances of color distance differences for pixels of the first and second groups are obtained as follows:

$$S_1^2(i) = \sum_{j=0}^{i-1} \left| d_j(n) - a_1(i) \right|^2 \quad \text{and} \quad S_2^2(i) = \sum_{j=i}^{K} \left| d_j(n) - a_2(i) \right|^2$$

(b-4) calculating a value *J(i)* as follows, using the obtained average and variance:

$$J(i) = \frac{\left| a_1(i) - a_2(i) \right|^2}{s_1^2(i) + s_2^2(i)}$$; and

(b-5) obtaining a value of *i* which makes *J(i)* maximum as follows:

$$m(n) = \arg_i \{\max J(i)\}$$

and selecting pixels ranging from a pixel having a small color distance to a pixel having the obtained value of *i* to determine a size m(n) of a peer group P(n).

30. (previously presented): The color image processing method according to claim 19, wherein the step (c) includes replacing a color vector of the central pixel with an average color vector value weighted by a predetermined weight that is larger for a pixel closer to the central pixel and is smaller for a pixel distant from the central pixel.

31. (original): The color image processing according to claim 30, wherein the predetermined weight is a value determined by a standard Gaussian function.

32. (previously presented): The color image processing method according to claim 19, wherein the step (c) includes replacing the central pixel $X_0(n)$ with a new pixel $X'_0(n)$ as follows:

$$X'_0(m) = \frac{\sum_{i=0}^{m(n)-1} W_i \, p_i(n)}{\sum_{i=0}^{m(n)-1} W_i}$$

where $p_i(n)$ are pixels constituting the peer group and W_i are predetermined weights corresponding to $p_i(n)$.

33. (previously presented): The color image processing method according to claim 29, further comprising, after step (b-5), the steps of:

selecting i pixels ranging from a pixel having a minimum color distance among the pixels sorted according to the color distance from the central pixel and setting a largest value of the color distances of the selected pixels as a maximum color distance within the peer group; and

performing color quantization by weighting color vectors of respective pixels by exp(-T(n)), wherein T(n) is the maximum color distance within the peer group.

34. (previously presented): The color image processing method according to claim 29, further comprising, after step (b-5), the steps of:

selecting *i* pixels ranging from a pixel having a minimum color distance among the pixels sorted according to the color distance from the central pixel and setting a largest value of the color distances of the selected pixels as a maximum color distance within the peer group; and

obtaining an average of T(n) values of a whole image and performing color quantization using a value obtained by multiplying the average value of T(n) with a predetermined constant to determine a number of clusters.

35. (previously presented): The color image processing method according to claim 21, further comprising, after step (b-5), the steps of:

selecting pixels whose number corresponds to the size of the peer group, ranging from a pixel having a minimum color distance among the pixels sorted according to the color distance from the central pixel and setting a largest value of the color distances of the selected pixels as a maximum color distance within the peer group; and

weighting color vectors of the respective pixels by exp(-T(n)), wherein T(n) is the maximum color distance within the peer group, and performing color quantization using a value obtained by multiplying an average of the T(n) values of a whole image with a predetermined constant to determine a number of clusters.

36. (previously presented): The color image processing method according to claim 32, further comprising, after step (b-5), the steps of:

selecting *i* pixels ranging from a pixel having a minimum color distance among the pixels sorted according to the color distance from the central pixel and setting a largest value of the color distances of the selected pixels as a maximum color distance within the peer group; and

obtaining an average of T(n) values of a whole image and performing color quantization using a value obtained by multiplying the average value of T(n) with a predetermined constant to determine a number of clusters.

37. (canceled).

38. (previously presented): A color image processing method comprising the steps of:

(a) defining a window having a predetermined size within an input color image;

(b) selecting pixels having a color vector similar to that of a central pixel within the window and defining the selected pixels as a group; and

(c) performing filtering of blurring using only the pixels within the defined group.

39. (currently amended): A computer readable medium having program codes executable by a computer to perform a color image processing method, the method comprising the steps of:

(a) defining a window having a predetermined size within an input color image;

(b) sorting image pixels according to a color distance between the image pixels and a central pixel;

(c) grouping the sorted pixels into groups in which a difference in an intragroup color distance is minimum and a difference in an intergroup color ~~difference~~ distance is maximum; and

(d) performing filtering by replacing a central pixel value with a predetermined pixel value determined by pixel values of pixels in the groups.

40. (previously presented): The computer readable medium according to claim 39, wherein before the step (c), the color image processing method further comprises the step of removing pixels having a color distance difference greater than or equal to a predetermined

threshold, for a predetermined number of pixels at a beginning and latter parts of the sorted pixels.

41. (previously presented): The computer readable medium according to claim 39, wherein the color image processing method further comprises the steps of:

selecting *i* pixels ranging from a pixel having the minimum color distance among the pixels sorted according to the color distance from the central pixel and setting a largest value of the color distances of the selected pixels as a maximum color distance within the selected group; and

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performing color quantization by weighting color vectors of the respective pixels exp(-T(n)), wherein T(n) is the maximum color distance within the peer group.

42. (previously presented): The computer readable medium according to claim 39, wherein the color image processing method further comprises the steps of:

selecting *i* pixels ranging from a pixel having a minimum color distance among the pixels sorted according to the color distance from the central pixel and setting a largest value of the color distances of the selected pixels as the maximum color distance within the selected group; and

obtaining an average of T(n) values of a whole image and performing color quantization using a value obtained by multiplying the average value of T(n) with a predetermined constant to determine a number of clusters.

43. (previously presented): The computer readable medium according to claim 39, wherein the color image processing method further comprises the steps of:

selecting pixels whose number corresponds to a size of a peer group, ranging from a pixel having a minimum color distance among the pixels sorted according to the color distance from the central pixel and setting a largest value of the color distances of the selected pixels as a maximum color distance within the selected group; and

weighting color vectors of the respective pixels by exp(-T(n)), wherein T(n) is the maximum color distance within the selected group, and performing color quantization using a value obtained by multiplying an average of the T(n) values of a whole image with a predetermined constant to determine a number of clusters.

44. (previously presented): The computer readable medium according to claim 39, wherein the color image processing method further comprises the step of receiving a color image frame and segmenting the same into a plurality of color images by a predetermined segmentation method, wherein the color image is an image selected from a plurality of color images.

45. (currently amended): A color image processing apparatus comprising:

sorting means for setting a window of a predetermined size within an input color image and sorting image pixels in the window according to a color distance between the image pixels and a central pixel;

grouping means for grouping the sorted pixels into groups in which a difference in an intragroup color distance is minimum and a difference in an intergroup color ~~difference~~ distance is maximum; and

filtering means for performing filtering by replacing a central pixel value with a predetermined pixel value determined by pixel values of pixels in the groups.

46. (previously presented): The color image processing apparatus according to claim 45, further comprising quantizing means for performing color quantization by weighting color vectors of the respective pixels by exp(-T(n)), wherein T(n) is a maximum color distance within a group having a smallest difference in the color vector from the central pixel within the window.

47. (previously presented): The color image processing apparatus according to claim 45, further comprising quantizing means for obtaining an average of T(n) values of a whole image and performing color quantization using a value obtained by multiplying the average value of T(n) with a predetermined constant to determine a number of clusters, wherein T(n) is a maximum color distance within a group having a smallest difference in a color vector from the central pixel within the window.

48. (previously presented): The color image processing apparatus according to claim 45, further comprising quantizing means for weighting color vectors of the respective pixels by exp(-T(n)), and performing color quantization using a value obtained by multiplying the average of T(n) values of a whole image with a predetermined constant to determine a number of clusters, wherein T(n) is a maximum color distance within a group having a smallest difference in the color vector from the central pixel within the window.

49. (previously presented): The color image processing apparatus according to claim 45, further comprising impulse noise removing means for removing pixels having a color distance difference greater than or equal to a predetermined threshold, for a predetermined number of pixels at a beginning and latter parts of the sorted pixels.

50. (original): The color image processing apparatus according to claim 45, further comprising segmenting means for receiving a color image frame end segmenting the same into a

plurality of color images by a predetermined segmentation method, wherein the color image is an image selected from the plurality of color images.